Dr. Elodie Lesage

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EDUCATION

2020: **Ph.D.**, Structure and Evolution of the Earth and other Planets, Geosciences Paris-Saclay (GEOPS) Laboratory, Paris-Saclay University, France.
"Study of Europa's Cryovolcanic Activity"

2017: **M.S.**, Planetary Sciences and Space Exploration, Paris-Saclay University, France

2015: **B.S.**, Physics, Nice Sophia-Antipolis University, France

PROFESSIONAL EXPERIENCE

2021 – pres: **Europa Clipper Project Science Affiliate**
Jet Propulsion Laboratory

2021 – pres: **Postdoctoral Researcher**
Jet Propulsion Laboratory, Planetary Interiors and Geophysics Group

2020 – 2021: **Postdoctoral Researcher**
GEOPS Laboratory, Paris-Saclay University, France

2017 – 2020: **Research Assistant**
GEOPS, Paris-Saclay University, France

2017 – 2020: **Teaching Assistant** – Undergraduate and Graduate classes
Earth Sciences Department, Paris-Saclay University, France
Geophysics and geochemistry, geology, radar and gravimetry, data analysis (statistics and signals), remote sensing of planetary surfaces. Total of 192 credit hours.

Internship mentoring

Jet Propulsion Laboratory, California, USA:

2022 – pres.: Julia Miller, graduate student. Modeling the thermal evolution of outer solar system icy bodies.

2022 – pres.: Beverly J. Malugin-Ayala, undergraduate student. Observation of Europa Clipper's science team.

GEOPS Laboratory, Paris-Saclay University, France:

2021: Justine Villette, graduate student. Modeling the chemical evolution of freezing cryomagma on Europa.

2019: Benoît Jabaud, graduate student. Production and analysis of Digital Elevation Models of Europa's surface and study of cryovolcanic features.

2018: Benoît Jabaud, undergraduate student. Geomorphological study of features on Europa's surface.

PUBLICATIONS

Wynne J. J. et al., incl. **Lesage E.** (2022) Planetary Caves: A Solar System View of Processes and Products. *Journal of Geophysical Research: Planets.* https://doi.org/10.1029/2022JE007303

Lesage E., Massol H., Howell S. M., Schmidt F. (2022) Simulation of Freezing Cryomagma Reservoirs in Viscoelastic Ice Shells. *The Planetary Science Journal*, 3(7), 170. https://doi.org/10.3847/PSJ/ac75bf

Lesage E., Schmidt F., Andrieu F., Massol H. (2021) Constraints on effusive cryovolcanic eruptions on Europa using topography derived from Galileo images, *Icarus*, Volume 361. https://doi.org/10.1016/j.icarus.2021.114373

Lesage E., Massol H. and Schmidt F. (2020) Cryomagma ascent on Europa, *Icarus*, Volume 335. https://doi.org/10.1016/j.icarus.2019.07.003

PRESENTATIONS

Invited talks

Lesage E. (2022) "Modelling reservoir-sourced cryovolcanism". Invited presentation for Europa Clipper's Plumes Focus Group.

Lesage E., Castillo-Rogez J., Choukroun M., Witasse O. (2022) "Exploration of Jupiter's moons: How the American-European collaboration promotes the search for habitable worlds". Primary scientific organizer and panelist for the Café des Sciences event hosted by the Consulate of France in Los Angeles.

Lesage E. (2022) "The exploration of Europa". Seminar for high school students of Los Angeles International High School about Europa Clipper, careers in Space Sciences and women in STEM.

Lesage E. (2021) Europa and Europa Clipper. Outreach presentation for the Apéro des Sciences gathering organized by the Consulate of France in Los Angeles.

Lesage E., Massol H., Schmidt F. (2021) "Effusive cryovolcanism on Europa". JPL Icy Worlds Collaboration and Exchange (ICE) Seminar.

Lesage E., Schmidt F., Massol H., (2021) "Freezing-induced pressurization of liquid reservoirs: constrains from Europa's surface topography". The Habitability of Hydrocarbon Worlds: Titan and Beyond

Selected scientific presentations

Lesage E., Howell S. M., Naseem M., Miller J. W., Villette J., Neveu M., Melwani Daswani M., Vance S. D. (2023) Chemical composition of erupted brines on Europa. Lunar and Planetary Science Congress (LPSC), oral presentation.

Miller J. W., Howell S. M and **Lesage E.** (2023) Modelling the thermal and compositional evolution of icy satellites, with application to Pluto and Triton. Lunar and Planetary Science Congress (LPSC), oral presentation.

Mc Keown L., **Lesage E.**, Scully J. E., Potter M., Tsai V. C., Diniega S. (2022) Lake stars as an analogue for Europa's Manannán crater spider feature. American Geological Union (AGU) Fall Meeting, presentation type TBD.

Pappalardo R. T., Buratti B., Korth H., Craft K. L., Daubar I., Howell S. M., Klima R. L., Phillips C. B., Leonard E. J., **Lesage E.**, Matiella Novak A., and the Europa Clipper Science Team (2022) Europa Clipper: A Mission to Explore Europa's Habitability. DPS meeting, oral presentation.

Lesage E., Howell S. M., Naseem M., Neveu M., Melwani Daswani M., Vance S. D. (2022) Chemical composition of erupted brines on Europa. European Planetary Science Congress (EPSC), oral presentation.

Oza A. and **Lesage E.**, (2022) Ascent and escape of liquid saltwater on exo-Europas orbiting at 1 AU and beyond. AAS Summer Meeting, oral presentation.

Oza A. et al., incl. **Lesage E.**, (2022) Extrasolar volcanism as a source for the tidally-evaporating super-Io candidate 55 Cancri-e. COSPAR Scientific Assembly, oral presentation.

Lesage E., Massol H., Howell S. M., Schmidt F. (2022) Viscoelastic deformation of freezing cryomagma reservoirs on Europa. Lunar and Planetary Science Conference (LPSC), oral presentation.

Howell S. M., Phillips C. B., Pappalardo R. T., Senske D. A., Korth H., Kampmeier J. L., Craft K. L., Klima R. L., Daubar I., Matiella Novak A., Paczkowski B. G., Ray T. L., Leonard E. J., Hay H. C., Persaud D. M., **Lesage E.** (2022) NASA's Europa Clipper: A Flagship Habitability Mission to an Alien Ocean World. Ocean Sciences Meeting (OSM), oral presentation.

Lesage E., Massol H., Howell S. M., Schmidt F. (2022) Can liquid water reservoirs erupt from within the ice of Jupiter's moon Europa? Ocean Sciences Meeting (OSM), oral presentation.

Lesage E., Massol H., Howell S. M., Schmidt F. (2021) Can liquid reservoirs erupt on Europa? American Geological Union (AGU), poster presentation.

Andrieu F., **Lesage E.,** Schmidt F., Massol H. (2020) DEM of Europa using photoclinometry only. European Planetary Science Congress (EPSC), oral presentation.

Lesage E., Schmidt F., Andrieu F., Massol H. (2019) Volume erupted during cryovolcanic events on Europa. American Geological Union (AGU), poster presentation.

Leblanc F., Caillé V., **Lesage E.,** Massol H., Schmidt F., and Oza A. (2019) Modelling Europa's plumes. Joint European Planetary Science Congress (EPSC) and Division for Planetary Sciences (DPS) Meeting, oral presentation.

Lesage E., Massol H., Schmidt F. (2018) Time scale of cryomagma eruptions on Europa, European Planetary Science Congress (EPSC), oral presentation.

Lesage E., Massol H., Schmidt F. (2018) Cryomagma ascent on Europa. Programme National de Planétologie (PNP), poster presentation.

Lesage E., Massol H., Schmidt F. (2018) Cryomagma ascent on Europa. Cryovolcanism in the Solar System Workshop (LPI, Houston, Texas), oral presentation.

Lesage E., Massol H., Schmidt F. (2017) Cryomagma ascent on Jupiter's moon Europa, European Planetary Science Congress (EPSC), oral presentation.

COMPETED AWARDS

2021: Co-I: *Contribution from modeling and spectro-photometry to study Europa's subsurface and cryovolcanic activity*. Programme National de Planétologie (PNP), France.

2020: Co-I: *Study of Europa's surface and subsurface using photometry and geophysical modeling*. Programme National de Planétologie (PNP), France.

2019: Co-I: *Study of Europa's surface and subsurface: Contribution from modeling and photometry.* Programme National de Planétologie (PNP), France.

2018: Co-I: *Europa's surface: Cryovolcanism and micro-texture modeling.* Programme National de Planétologie (PNP), France.

OUTREACH

Presentations and projects

2019: "Icy Moons" Presentation during the outreach event "Face à l'Univers" for the 80th anniversary of CNRS (Centre National de la Recherche Scientifique).

2018: "What controls the size of an impact crater?" Four-month scientific project for middle school students in collaboration with their science teacher. Awarded 2nd place of the French national prize "La main à la pâte" which promotes science teaching in middle and high schools.

2017, 2018: "The Solar System Travel Agency" Oral presentation for kids during the annual outreach scientific event at Paris-Saclay University.

Published communications

"Here's why Saturn's 'ocean moon' is constantly spewing liquid into space" (2022) Popular Science. https://www.popsci.com/space/saturn-moon-enceladus-tiger-stripes-explained/

"Ice volcanoes on Europa's surface" (2021) News CNRS-INSU n°362. https://www.insu.cnrs.fr/fr/cnrsinfo/des-volcans-de-glace-la-surface-deurope

"Smooth plains on Europa" (2021) Planetary Geomorphology Image of the Month blog. https://planetarygeomorphology.wordpress.com/2021/07/01/smooth-plains-on-europa/

PEER-REVIEW ACTIVITIES

Nature Communications, Geophysical Research Letters, Geochimica et Cosmochimica Acta, Journal of Geophysical Research – Planets, Icarus.